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DEPARTMENT: CHEMICAL ENGINEERING

COURSE CODE: CHE 362

COURSE TITLE: COMPUTER APPLICATIONS IN CHEMICAL ENGINEERING

ASSIGNMENT II

From the general balance law,

Input rate – output rate = Accumulation rate

= yin - yout

Since 10 gallons enter per minute and one gallon contains 5 lb of salt, it means that the amount of salt entering the tank is:

Yin = 10 x 5 = 50

The tank contains 1000 gal of water with the dissolved salt, and 10 gallons of the solution leave the tank per minute.

That is, = 1%of the content of the tank. If that is the case, 1% of the salt present in the tank will also leave the tank per minute. In other words,

yout = 1% of y

= 50 – 0.01y

= -0.01(y – 5000)

= -0.01dt

Integrating both sides

=

= -0.01

In(y-5000) = -0.01t + C

y – 5000 = e-0.01t + c

y – 5000 = e-0.01t \* ec

let yo = ec

y – 5000 = yoe-0.01t

y = 5000 + yoe-0.01t

**MATLAB**

commandwindow

clear

clc

f = @ (t, y)[5000+(y\*(exp(-0.01\*7)))]

tspan=[0:0.5:7]

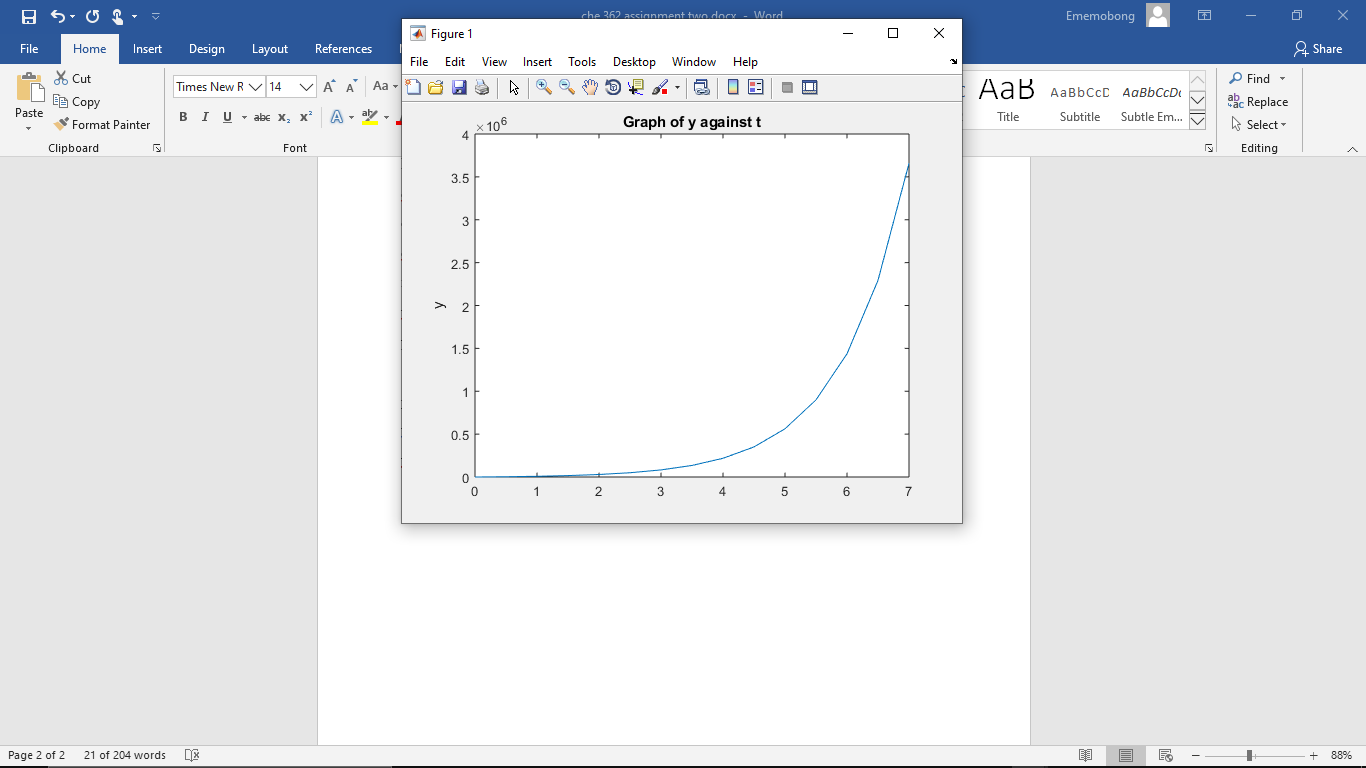
y=0

[t,y] = ode45(f,tspan,y)

plot(t,y)

title('Graph of y against t')

ylabel('t'), ylabel('y')



**MATLAB (EULER METHOD)**

commandwindow

clear

clc

t0=0

tn=7.0

h=0.5

t = t0:h:tn

n=length(t)

y(1)=0

for i=1:n-1

yn(i+1) = (5000+((y(i))\*(exp(-0.01\*7))))

y(i+1)=y(i)+h\*yn(i)

end

tablo=[y' yn']

plot(t,y)

grid minor

